AIR COMMAND AND STAFF COLLEGE

AIR UNIVERSITY

Fixing the DOTMLPF Handicap:

Effectively Integrating the Conventional Combat Air Force

Into Special Operations Forces Missions

by

David C. Epperson, Major, USAF

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: Lt Col Robert Hume

Maxwell Air Force Base, Alabama

April 2010

Disclaimer

Introduction

In irregular warfare (IW), special operations forces (SOF) commonly depend on conventional aircraft to conduct close air support (CAS) to compensate for lack of organic firepower. Current CAS doctrine focuses on conventional warfare and fails to provide the proper tools for SOF joint terminal attack controllers (JTACs), pilots, and aircrews to perform at the peak of their capability, instead forcing real time improvisation in IW.

Staff Sergeant Ed Shulman's following observation of CAS coordination in the early days of Operation ENDURING FREEDOM (OEF), in late 2001, highlights one of many deficiencies with respect to integrating conventional aircraft in support of Special Operations. Sergeant Shulman was an enlisted tactical air controller (ETAC) sent to fix CAS coordination issues in the Special Operations Liaison Element (SOLE) at the Combined Air Operations Center (CAOC) at Prince Sultan AB, Saudi Arabia.

> These guys are basically running what I called the "sticky note ASOC," where you've got people running around a building with little yellow sticky notes going, "Hey, Tiger XX needs CAS," "Hey, Cobra XX needs aircraft," "These guys are troops in contact," and it was completely disorganized. It was a mess. You'd see notes stuck up on computer screens, "Cobra whatever needs CAS now!" I'm going, "Hey is that something that needs to be worked? Do you guys not have time to talk?" And they're like, "Oh, that's from yesterday." So you can see . . . how stuff like that can break down really quickly. . . .
>
> We got right up on mIRC Chat--it's like [an] instant messenger-type online chat protocol, but we were using it over SIPRNET. We didn't have any direct radio contact with [TF Dagger in Afghanistan] . . . so I opened a dialogue with them and as soon as I typed in "hey, . . . it's Ed," all of a sudden I got this long, "Hey, oh God, we're so glad you're there, nobody's been there before, this is going to make stuff easier." . . . They were tracking things effectively, but they had no way to communicate what they were doing to the guys at the CAOC. . . .[1]

This example clearly indicates one of many areas where the Joint and Air Staffs need to update CAS doctrine, organization, training, materiel, leadership and education, personnel, and

facilities (DOTMLPF) to provide the same support and guidance for irregular warfare that it currently provides for conventional warfare. OEF opened with 110 Central Intelligence Agency operators and 316 SOF banding together with local militias in Afghanistan and using airpower to defeat the Taliban and destroy Al Qaeda.[2] The Taliban typically outgunned the lightly armored SOF and Northern Alliance militia. Without artillery to back them up on combat missions, airpower served as the great equalizer.[3] The terrain and austerity of Afghanistan limited the use of SOF aircraft, and put the tremendous load for support on fixed-wing conventional aircraft. Named the Afghan Model, after its development in OEF, this strategy pairs SOF with indigenous fighters and overwhelming air power to defeat the enemy.[4] While the Afghan Model proved effective in defeating the Taliban, lack of doctrinal guidance forced a pick-up game with respect to CAS. In 2001, SOF CAS typically depended on an already established Air Force Theater Air Control System and Army Air-Ground System (TACS/AAGS) to provide operational control of CAS assets, however without conventional Army participation no TACS/AAGS existed in OEF.[5]

As annotated in the opening vignette, in the absence of an established TACS/AAGS the SOF community attempted to accomplish the same tasks internally. Initially, four special operations tactical air controllers ran a fire support shop that attempted to accomplish the TACS/AAGS portion in theatre.[6] At the same time, the SOLE at the CAOC endeavored to fill the TACS role of the Air Support Operations Center (ASOC) with two NCOs and a warrant officer.[7] This example illustrates the inefficiencies of tasking improperly trained personnel to accomplish critical air-ground integration.

A six-person team of air liaison officers (ALOs) and ETACs eventually arrived to form a bare bones ASOC.[8] Although the personnel with proper experience and qualifications were finally running the ASOC, they were still undermanned to provide proper support.[9] The lack of

capability to cover all of the operational planning while executing current operations became apparent during the heightened level of CAS requirements for Operation ANACONDA. With the potential for future Afghan Model operations, or similar demands of robust foreign internal defense (FID) operations, it is unacceptable to equip SOF with a "sticky note ASOC."

Thesis

The previous anecdote highlights one of the issues of poor doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) with respect to SOF CAS. This paper focuses on CAS provided to SOF for overt and clandestine missions. Current Joint DOTMLPF creates tactical and operational limitations that SOF and conventional CAS aircrew must overcome in the heat of battle. Current CAS DOTMLPF focuses on conventional warfare with conventional ground units and fails to provide the proper IW tools, instead forcing improvisation. The Joint and Air Staffs must update doctrine to enhance the organizational structure of Theater Air-Ground System (TAGS). The TAGS organization needs to provide SOF with their own ASOC to assist in the operational planning and control of the relevant portions of TAGS, especially in the absence of the conventional Army's AAGS. Joint Publication 3.09-3 needs to increase available tactics, techniques, and procedures by adding a Fixed-Wing Call for Fire to give SOF an expedient method to target CAS aircraft in critical life threatening situations. For training, the joint community needs to put a concerted effort into SOF and IW pre-combat deployment exercises; merging JTACs, conventional aircraft, and the ASOC to strengthen the CAF/SOF bond. To enable better training, the joint community must procure air and ground facilities to adequately simulate current SOF CAS combat situations. SOF need to enable the education of conventional aircrews by giving them access to secret compartmentalized SOF information. In the personnel category, the creation and employment of a Liaison Officer

To Special Operations (LOTSO) will strengthen the relationship and provide a means for detailed integration down range. The Air Force must prioritize putting highly qualified personnel in both the ASOC and LOTSO to provide effective leadership. Enhancements across the spectrum of DOTMLPF, with respect to CAS in support of SOF, is required to provide SOF the ability to employ CAS properly in current and future combat operations.

Research Methods

Due to the recentness of OEF and Operation IRAQI FREEDOM (OIF) combined with the secret nature of SOF missions, many details about specific applicable missions remain classified. However, some of the declassified accounts provide insight into the challenges faced when integrating conventional airpower with SOF missions. Combining declassified information with the observations and conclusions of subject matter experts and firsthand experience of the author, enables this paper to remain unclassified and still address shortfalls in the DOTMLPF.

The Problem

Since the advent of the aircraft and its involvement in warfare, Army ground forces constitute the largest user of Air Force CAS.[10] Correspondingly, the majority of service and joint DOTMLPF governing CAS focuses on the interaction and support between Air Force assets and Army ground personnel. Until recent conflicts, the CAS DOTMLPF focus appeared to emphasize the most critical relationship as the interaction between conventional air and ground forces. However, the nature of the current "Long War" highlights another critical CAS mission set, SOF support.[11] Although SOF constitute a smaller proportion of overall CAS missions, they often have the greatest CAS requirements.[12] An anecdote from early SOF operations in Afghanistan illustrates the lack of applicable SOF CAS doctrine, "Task Force Dagger put a sign

over their shredder that said, "Put doctrine here.""[13] Operators need relevant doctrine that can

serve as a tool in conducting current and future operations.

The majority of SOF CAS missions support Direct Action (DA) missions. SOF DA

missions operate with extreme fluidity. The objectives of these SOF missions are typically to

neutralize or capture a high value target and greatly depend on intelligence. The time and

location are subject to rapid change as the situation and associated intelligence change. The

fluidity, tempo, and complexity of SOF missions make them some of the most demanding CAS

missions that require real-time detailed integration. Additionally, SOF CAS missions often make

the critical difference in survival of the ground forces by attacking enemy forces in close

proximity to friendly troops.[14] Due to the complexity inherent in SOF CAS, tactical operators

need doctrine to simplify their mission and minimize required on-the-fly innovations. Likewise,

as the Army completes its transformation towards a modular force operating in smaller units it

will face some of the same lack of firepower and mass challenges that SOF face today.[15] Based

on this premise of increased dispersion of force and increased need for air support, conventional

Army CAS can leverage the advantages gained by perfecting doctrine and training for SOF CAS.

Doctrine (Pertaining to Organization)

As discussed earlier, doctrine fails to address the Afghan Model's slightly modified use

of kinetic CAS.[16] Execution of the Afghan Model in Afghanistan and Iraq poised a weaker

indigenous force against a stronger opposing force. [17] In Afghanistan, SOF teamed up with the

under-armed Northern Alliance and airpower to defeat the Taliban who possessed superior

numbers and firepower.[18] In Iraq, SOF joined forces with Kurds in Northern Iraq and used

airpower to take on the Iraqi Army who outgunned and outmanned the Kurds.[19] In both cases,

the SOF advisors overcame the lack of firepower and personnel with airpower in the form of

CAS. While the Afghan Model is not a panacea, it provides a basis for future variations of the same tactics in future conflicts, especially in counterinsurgency and FID strategies.[20]

Although FID is different from the Afghan Model, the same advantages of the Afghan Model could provide decisive airpower to assist in FID. Like the Afghan Model, SOF may initially be the preponderant force on the battlefield in a FID operation. SOF specifically train and equip to carry out FID tactics, but they lack an internal mechanism to properly coordinate operational-level air support. Events at the start of OEF in Afghanistan illustrated SOF's lack of capability to conduct their own operational planning and control of airpower.[21] Colonel Neuenswander, who served as an A-10 Forward Air Controller (Airborne) (FAC(A)) in Operation ANACONDA, asserted most of the problems were "caused by an absence of planning at the operational-level. The operational-level command and control mechanism that should have prevented most of this chaos was the TACS/AAGS."[22] In this example, SOF lacked sufficient TAGS representation, and when the operation rapidly transitioned to include conventional ground forces the 10th Mountain Division did not put the complete TAGS in place prior to Operation ANACONDA.[23] Once fully integrated into OEF, the ASOC became a key enabler.[24]

Doctrinally, an Air Support Operations Squadron (ASOS) and ASOC in conjunction with the CAOC accomplish the operational planning and control of CAS for the conventional Army.[25] An ASOS is assigned to the SOF groups, but no ASOC is specifically assigned to SOF.[26] Joint doctrine states that it is up to the discretion of the Joint Force Air Component Commander (JFACC) to provide additional TACP and/or ASOC support when deemed necessary.[27] Historically, the lack of an ASOC has not been a problem since a SOF unit does not need such robust organizations for its more limited scope operations. In addition, SOF can siphon support from an ASOC supporting the conventional fight when required.[28] During the SOF and Kurdish

fight in Northern Iraq, SOF used the existing TAGS put in place for the conventional Army southern push to provide operational-level planning and support.[29] However, solely Afghan Model operations will not have the luxury of a conventional force, and their corresponding ASOC, for SOF to use. According to Air Force Instruction (AFI) 13-114v3 the "ASOC links the air component to the land component and melds the operational and tactical [levels]" and "creates and coordinates procedural control plans."[30]

In OEF, the procedural control plan was a key element missing which led to aircraft and bomb deconfliction issues and corresponding inefficient CAS.[31] AFI 13-114v3 further stresses that the ASOC must possess a "detailed understanding of the friendly order of battle" to conduct proper mission planning.[32] In a robust FID or Afghan Model operation, the ASOC needs to directly support and work with SOF to gain the required detailed understanding. This is unlikely to happen under current doctrine that provides ASOC support to SOF as an afterthought. Air Force doctrine states, "To integrate effectively airmen must accomplish realistic training scenarios and share ideas within the joint community."[33] By not providing an ASOC directly to SOF, the Air Force contradicts its own doctrine and instruction. Without realistic training, the ASOC cannot be expected to have a detailed understanding of SOF operations and provide appropriate support during planning and execution.

The SOF community's air component is not designed to fill the same roles as an ASOC in the TACS system. According to joint doctrine, beneath the Joint Special Operations Task Force (JSOTF) the Joint Special Operation Air Component (JSOAC) is responsible for "planning and executing joint Special Operations air activities."[34] The focus of the JSOAC is on SOF aircraft supporting SOF. Additionally, the JSOAC works through its SOLE at the CAOC to deconflict and integrate SOF aircraft with conventional air operations.[35] The JSOAC is the SOF

air expert, but not the conventional air expert. As such, the JSOAC does not operate along the same lines of the TACS and is not equipped to plan or execute robust conventional CAS missions at the operational-level.

While not required for every SOF operation, a SOF ASOC would provide an internal capability to scale air operations according to need and provide the appropriate operational planning and execution capabilities. Colonel Neuenswander responded to criticisms of CAS operational and tactical deficiencies in Operation ANACONDA by stating, "All of these issues could have been solved by planning for and setting up a healthy ASOC within radio range of the Shah-e-Kot Valley."[36] The Joint and Air Staffs need to modify doctrine to provide SOF with its own ASOC. The SOF ASOC should be scalable to the operation and melded with the JSOAC to provide integrated operational planning and control of SOF and conventional air assets for the entire JSOTF. If manning is insufficient to dedicate an ASOC to SOF, then doctrine should give explicit guidance on when and how an ASOC should augment SOF operations. In the absence of a dedicated SOF ASOC, a select number of ASOCs should conduct routine training with SOF to gain the required knowledge and working relationship to support SOF effectively in combat.

Doctrine (Pertaining to Tactics, Techniques, and Procedures)

Joint Doctrine is lacking in Tactics, Techniques, and Procedures (TTPs), as well. Conventional Army forces utilize organic firepower and mass to counter an enemy. Typically, conventional forces bring their own artillery to the fight, and use CAS to augment artillery firepower. A good illustration of fixed-wing aviation's role supporting the current fight is the use of kinetic employment. The majority of aircraft munitions expenditures result from Troops in Contact (TIC) situations. Joint Publication 3-09.3 defines a TIC as "friendly ground forces receiving effective fire."[37] There are many instances in the AOR when conventional forces are

taking small arms fire from the enemy, but decide not to declare a TIC because their inherent mass and firepower are sufficient to neutralize the threat.[38] Instead, conventional forces typically establish TICs for two main reasons: locating a large improvised explosive device (house, vehicle, bunker, tree, etc.) or locating a mortar team.[39] If the conventional forces lack an explosive ordnance disposal team or deem it too dangerous, kinetic CAS provides the ground commander a method to remove the threat. In addition, there are times when counter battery fire is not possible and CAS is an effective way to precisely target an enemy mortar team.

SOF more closely resembles the Marine Corps with respect to organic firepower. As an expeditionary force, the Marine Corps travels light without the benefit of heavy artillery. To compensate for their lack of heavy firepower, the Marine Corps uses its helicopters and fixed-wing aircraft as airborne artillery. With SOF, the problem is magnified even further. Not only do SOF lack heavy firepower, they also typically lack the Marine Corps' mass. SOF rely on speed and surprise to negate enemy advantages. However, sometimes executing these principles is not enough and SOF need CAS to keep the fight in their favor. For this reason, kinetic CAS employment in support of SOF is typically against enemy personnel and forces, instead of the conventional Army's current IED and mortar team targets. The bulk of kinetic employment, in support of SOF, keeps enemy reinforcements from affecting the battle, or prevents enemy personnel from escaping.[40]

While both conventional and SOF roles for CAS are important, the SOF role is typically more time critical to friendly force survival and mission accomplishment.[41] Time critical situations require focused and relevant doctrine to deal with the situation. Specifically, SOF need an effective and efficient way to provide conventional fixed-wing aircraft with targeting information. Additionally, the Army Transformation is changing the way the Army organizes

and fights, which will tend to decrease the available organic firepower.[42] This means that TTPs

developed for small unit SOF CAS will enhance the Air Force support of the newly transformed

conventional Army.

Basic kinetic employment relies on the same TTPs outlined in joint doctrine, with one

major caveat, targeting. In line with JFIRE, conventional Air Force and Army units use the CAS

9-Line Briefing (Figure 1) to communicate targets.[43] The 9-Line Briefing contains nine specific

pieces of information and remarks to guide the conduct of attack. Line six, target location, is the

central focus of this targeting format and line eight, location of friendlies, is referenced in range


```
Format 15. Close Air Support 9-Line Briefing
Do not transmit line numbers.  Units of measure are standard unless briefed.
Lines 4, 6, and restrictions are mandatory readback (*).  JTAC may request
additional readback.

JTAC: "_____, this is _____"
            (Aircraft Call Sign)              (JTAC Call Sign)
"Type _____ (1, 2, or 3) Control"

1.  IP/BP: "_____"
2.  Heading: "_____"
                 (Degrees Magnetic, IP/BP-to-Target)
    Offset: "_____"
                    (Left / Right, when required)
3.  Distance: "_____"
                (IP-to-target in nautical miles, BP-to-target in meters)
4*.  Target Elevation: "_____"
                            (In feet MSL)
5.  Target Description: "_____"
6*.  Target Location: "_____"
            (Lat/Long or grid to include map datum or offsets or visual)
7.  Type Mark: "_____" Code: "_____"
            (WP, Laser, IR, Beacon)        (Actual Laser Code)
8.  Location of Friendlies: "_____"
            (From target, cardinal direction and distance in meters)
    Position marked by: "_____"
9.  "Egress: _____"
Remarks (as appropriate): "_____"
(Restrictions*, Ordnance delivery, threats, final attack heading, hazards,
ACAs, weather, target information, SEAD, LTL/GTL [degrees magnetic], night
vision, danger close [with commander's initials])
Time on Target: "_____"  or
Time to Target: "_____"
"Standby _____ plus _____, ready, ready, HACK"
            (minutes)          (seconds)
Note: When identifying position coordinates for joint operations, include map
data.  Grid coordinates must include 100,000 meter grid identification.
```

Figure 1 Close Air Support 9-Line Briefing (reprinted from JFIRE)

and bearing from the target.[44] With the 9-line format, the JTAC must provide the aircraft with specific target coordinates or a visual talk-on to the target. Following a visual talk-on, some rules of engagement (ROE) require pilots to secure target coordinates and read them back to the JTAC. This procedure is well suited for conventional use with numerous friendly force positions, which make it impossible for aircrew to have full SA on precise friendly locations. The procedure also suits current conventional operations, where JTACs control the majority of CAS missions from Tactical Operation Centers (TOCs).[45] The JTACs use video downlinks from CAS fighters and remotely piloted vehicles (RPVs) to monitor the situation and provide targeting data to the pilots. Conversely, SOF JTACs typically accompany a small DA team and provide control from the battlefield where they might be pinned down by enemy fire.[46] In these instances, the 9-Line Briefing format is cumbersome, slowing CAS down and putting friendly lives at risk.[47]

AC-130 aircraft, typically flying in support of SOF ground personnel, use a second format for JTACs to target aircraft, the AC-130 Call for Fire (Figure 2).[48] The AC-130 Call for Fire uses a friendly centric method instead of the 9-Line's target centric method. In this format, line two, friendly location/mark, provides the anchor point. Line three, target location, references target position in relation to friendly location using bearing and range.[49] During SOF CAS missions, it is imperative to maintain SA on the SOF location. One role of the CAS aircraft is to provide real-time battlespace awareness to the JTAC and his team. This requires monitoring friendlies and conducting search patterns that originate at the SOF and move outward.[50] Thus, typical SOF CAS roles enable an efficient transition to kinetic employment using the friendly centric targeting methodology in the AC-130 Call for Fire.[51]

The AC-130 Call for Fire format provides a perfect template to broaden for use with fixed-wing conventional aircraft. Army rotary-wing aviation uses the same friendly centric

```
                Format 16. AC-130 Call for Fire
  1. Warning Order:
  "_____, this is _____, Fire Mission, Over"
   (AC-130 Call Sign)      (Observer Call Sign)
  2. Friendly Location / Mark:
   "My position _____, marked by _____"
              (TRP, Grid, etc.)              (Strobe, Beacon, etc.)
  3. Target Location: "_____"
              (Magnetic bearing and range in meters, TRP, grid, etc.)
  4. Target Description / Mark: "_____ marked by _____"
                  (Target Description)     (LTM, Tracer, etc.)
  5. Remarks: "_____, Over"
  (Threats, Danger Close, Restrictions, At My Command, etc.)
  As Required
  1. Clearance: Transmission of the fire mission is clearance to fire (unless
  danger close). For AC-130, danger close is 165m for the 105mm, 75m for the
  40mm, 100m for the 30mm, and 65m for the 25mm. For closer fire, the
  observer must accept responsibility for increased risk. State "Cleared
  Danger Close" (with commander's initials) on Line 5. This clearance may be
  preplanned.
  2. At My Command – For positive control of a gunship, state "At My
  Command" on Line 5. The gunship will call "Ready to Fire" when ready.
```

Figure 2 AC-130 Call for Fire (reprinted from JFIRE)

targeting methodology for ground forces to designate desired targets.[52] It is easy for the JTAC to

provide his own location to the aircraft. Friendly forces can identify themselves with a variety of

different visual markers including: mirror flashes, VS-17 panels, vehicle type, IR strobes, and IR

pointers accompanied by a visual talk-on. Additionally, if initial visual acquisition proves too

challenging or time consuming based on the situation, JTACs can resort to electronic means to

aid aircrew in establishing the visual with friendlies. With a GPS receiver, it is simple for the

JTAC to acquire his own coordinates and transmit those to the aircrew. Then, pilots enter the

coordinates into their system and use their onboard sensors to locate the friendly position. If

equipped with Blue Force Tracker, the JTAC could even omit this step, as the friendly position

would be indicated in the aircraft's sensors. Another alternative is for SOF to carry a radar

beacon, which some aircraft can locate with their radars, and then pass the information to their

other onboard sensors to gain friendly location.[53] Since establishing visual with friendlies is

critical for a friendly centric targeting methodology, aircrew and JTAC must confirm acquisition

via visual cues and two-way communication. Once the friendly location is identified, it is easy to

locate the enemy location in range and bearing primarily using eyes or targeting pods. Once

kinetic employment begins it becomes easier to shift fire, because the JTAC simply adjusts range

and bearing instead of creating new target coordinates.

Fixed-Wing Call for Fire 5-Line

1: **Warning Order / Control Type:**
"_____ , this is _____ with a Fixed-Wing Call for Fire, Type ____ Control in Effect."
(Aircraft C/S)   (JTAC C/S)   (Type 1, 2, or 3 Control)
"_____, ready to copy"[1]
(Aircraft C/S)
2: **Friendly Location / Mark:**
"My position _____ , marked by _____"[2]
             (TRP, Grid, etc.)   (Smoke, Strobe, Beacon, etc)
"_____, visual friendlies"
(Aircraft C/S)
3: **Target Location:**
"Bearing _____ for _____"[3]
     (Magnetic Bearing)   (Range in Meters)
4: **Target Description / Mark:**
"_____, marked by _____"
 (Target Description)   (Smoke, Tracer, etc.)
5: **Remarks (As Required):**
"_____, Over"
(Ordnance, Danger Close, Restrictions, GTL/LTL, etc.)

Notes:
  1. Requires direct communication and acknowledgment from the supporting CAS aircraft. (***No communication relay allowed.)***
  2. Focused towards visual acquisition of friendlies by CAS aircrew. (TGP visual acceptable) All communication stops until aircrew acquires friendlies and makes "Visual Friendly" radio call.
  3. Provides for visual means (TGP included) of target acquisition and weapon employment. (Strafe, Free Fall Munitions, Laser Guided Bombs, or Inertially Aided Munitions using aircraft generated Bomb on Target procedures, but ***no Bombs on Coordinates permitted.)***

Figure 3 Proposed Fixed-Wing Call for Fire Format

The major concern with this format is that it must provide the aircraft with precise

friendly location, this concern is amplified if friendly coordinates are provided to assist the visual

acquisition.[54] With a significant amount of munitions being coordinate seeking, the risk of

fratricide increases. The aircrew discipline is required in order to not drop on the friendly

coordinates entered into the system, but use a visual means of targeting the enemy.[55] Some

aircraft sensor displays can overlay friendly positions on the targeting pod or radar picture. This

enables the pilot to ensure he is targeting the correct target and keeping munitions a safe distance

away from friendly forces. The AC-130 software provides a safeguard, by putting a weapons inhibit zone around an entered friendly location.[56] If deemed necessary, software engineers could institute the same software precautions on other aircraft.

The Fixed-Wing Call for Fire (Figure 3) would provide an additional tool for the JTAC to use when the conditions warranted. In an unconstrained threat and time situation, the JTAC could still use the 9-Line Briefing format. In addition, it would depend on aircraft capabilities. To confirm friendly acquisition the aircraft, both fighter and bomber, would need an advanced targeting pod or be able to fly low enough to the ground to visually acquire the friendlies. This method would enable a pinned down JTAC in a time critical situation, to quickly and effectively call for fire support to regain the advantage and win a firefight.

Training / Facilities

Another area lacking appropriate attention is joint training. The SOF community made an effort to fill the training void with the JADED THUNDER training exercise, but it lacks priority and support from the Air Force.[57] Accordingly, the Air Force does not commit funds for units to attend the exercise.[58] Additionally, JADED THUNDER suffers by acquiring sub-optimum airspace that decreases conventional flying units' desire to attend.[59] When paying for the exercise out of their own tight budgets, flying units do not want to waste their money on poor airspace and correspondingly poor flight training.

The Air Force and Army answer to the increased role of CAS in the current AORs is a corresponding increase in emphasis on Green Flag. Currently two Green Flags, east and west, provide Air Force and Army units the opportunity to practice CAS in a joint exercise prior to combat. According to the Green Flag West mission statement, the purpose is to "provide world class CAS counter land airpower training for USAF, sister service, and international combat

fighter, bomber, and airborne command and control squadrons stressing realistic combat environments focused on high desert armored warfare."[60] Similarly, the Green Flag East goal is "to train participants to effectively integrate airpower in conjunction with US Army maneuver units across a broad spectrum of activity with special emphasis on counterinsurgency and irregular warfare."[61] The common theme of both mission statements is the focus on Air Force and Army integration, without reference to Air Force and SOF integration.

Although absent from their mission statements, both Green Flags appreciate the need for specific SOF CAS training. At Green Flag West, the 549th CTS provides flying units and ground units with three distinct areas of operation (AOs) for training. The primary AO scenario focuses on a conventional Army brigade engaged in a counterinsurgency, irregular warfare, fight set to replicate OIF or OEF based on the brigade's upcoming deployed location.[62] The second AO enables live weapons employment.[63] The third AO is dedicated to OEF scenario SOF CAS, focused on mountainous and urban small unit SOF support.[64] The first incorporation of the SOF AO was Green Flag 09-03 in 2009 and has since operated in five of the 10 Green Flag West exercises.[65] According to the 549th CTS Director of Operations, the SOF AO is the lowest priority and only utilized "in exercises where we have enough air to support all three AOs."[66] When Green Flag allocates aircraft to the SOF AO, it is typically only 18% to 26% of the available sorties.[67] This means that a significant portion of the pilots involved in the two-week exercise experience the SOF AO one time. Green Flag incorporates most of the relevant SOF units to include Air Force Special Tactics Squadrons, Navy SEALs, and Army Rangers.[68]

The Green Flag SOF AO accurately represents OEF by operating over two small towns located in a valley bordered by the Sierra Nevada Mountains reaching up to an altitude of 14,000 feet. [69] An operating agreement with the local government allows the SOF teams free access to

the towns and surrounding mountains.[70] However, some drawbacks prevent the training from truly representing combat situations. Operating over civilian population, instead of a military range, restricts the use weapons and laser employment.[71] While weapons employment can be simulated, integrated SOF and aircraft tactics requiring laser designation and acquisition cannot effectively be simulated. Additionally, the airspace is a shared use Military Operating Area (MOA). As a shared use MOA, the airspace cannot be exclusively scheduled and the training is often put on pause to allow Navy aircraft to transit the MOA.[72] While real world aircraft deconfliction issues exist in combat, a ROZ is constructed around a SOF operation protecting the airspace. The biggest impact to training is losing time because of wasted gas while aircraft wait for the exercise to resume.

The Air Force needs to modify its training focus to match current CAS requirements. Green Flag made positive moves by instituting the SOF AO last year, but it is not enough. At a minimum, SOF CAS needs to gain an equal footing with conventional CAS. Green Flag should operate the SOF AO during each of its 10 yearly exercises, with a minimum requirement of sending each aviator to the SOF AO at least once. Furthermore, Green Flag should raise its goal to provide each aviator the SOF AO experience twice, enabling lessons learned during the first experience to be put to use and solidified during the second experience. To make the most of the limited aircrew exposure to the SOF AO, the Air Force needs to gain exclusive use of the associated MOA during SOF AO exercises. Green Flag can also provide a solution to the lack of emphasis on JADED THUNDER. A simple solution is to merge JADED THUNDER with Green Flag twice a year. To minimize impact and provide multiple training venues, JADED THUNDER could pair with Green Flag West and East once per year each. This merges two

funding sources together towards the common goal of ensuring conventional aircrew and SOF ground units can effectively integrate in combat CAS operations.

The additional emphasis on SOF CAS provides impetus to improve the training facility. While it is difficult to achieve both the reality of operating in an urban environment and the ability to employ weapons and lasers, it is possible to compartmentalize to achieve the same objectives. The current SOF AO that Green Flag West uses provides the reality of a town, while the Nevada Test and Training Range (NTTR) could provide the capability to employ lasers and weapons in a simulated urban environment. The NTTR contains an Urban Operations Complex (UOC) that provides a simulated city while maintaining the ability to employ lasers and weapons.[73] Green Flag could utilize both locations as SOF AOs during JADED THUNDER and provide realistic training. The NTTR airspace is in high demand, so this would need to be carefully deconflicted with the other airspace requirements.[74]

Finally, to ensure that the entire SOF CAS system trains as they fight, Green Flag needs to incorporate a real world SOF ASOC and LOTSO into their training exercises. Because the focus of Green Flag is on tactical level execution, contractors simulating the operational-level tasks fulfill the ASOC role.[75] According to the ASOC Enabling Concept, "ASOCs must participate and exercise standard operating procedures in joint/interservice/flag-type exercises."[76] Green Flag is the proper "flag-type" exercise to incorporate an actual ASOC to enhance training for ASOC personnel, JTACs, and aircrew.

Leadership and Education / Personnel

At the tactical level, SOF CAS missions escort SOF DA teams into enemy territory and provide heavy firepower when required. These SOF lack the organic firepower sometimes required to overcome the adversary.[77] Instead, SOF depend on airpower to provide the firepower

and maintain their advantage.[78] When able, a variety of SOF and Other Governmental Agency (OGA) rotary-wing and fixed-wing aircraft support ground SOF teams. However, the time of day, enemy threat, and location of the mission can decrease the amount of air assets available to support. Conventional fixed-wing aircraft provide the buffer, as well as the overwhelming punch.[79] Additionally, fixed-wing aircraft are the only ones capable of carrying 250 pound and larger munitions required for targeting buildings and bunkers. For these reasons, the SOF CAS stack of aircraft is the most robust and complex of any mission.[80] In such a stack, one to two thousand feet of altitude separate aircraft that densely stack from the surface up to 20,000 feet, or higher. Comparatively, a conventional CAS stack often maintains a maximum of two to four aircraft. The conventional fixed-wing aircraft typically orbit at the top of the CAS stack, deconflicted from the other players.[81]

Due to security restrictions, most conventional pilots do not know all of the aircraft types and capabilities in the stack, which limits their overall SA and ability to contribute to the mission. In Afghanistan, different combat units did not know what each other were doing based on the tight compartmentalization.[82] In addition, the rest of the players in the stack enter the stack with higher SA of the mission objective and scope because they have been part of the mission from the beginning or have LNOs in the JSOAC with direct access to the information. Conversely, conventional aircraft typically play a pickup game with little more than the general location, JTAC callsign, and JTAC frequency.[83] Once arriving on station and frequency the conventional aircrews rarely receive the entire situation brief and may or may not receive specific tasks.[84] Conventional aircrews often glean information from the JTAC frequency, as they listen to the communications between the ground personnel and other aircraft in the stack.[85]

The aircrews expertly execute their tactical tasks, but could make greater contributions to the overall mission if they fully understood its objectives and tactics.

With increased SA, aircrew could better provide real-time mission surveillance besides being on call for kinetic employment. At the top of the CAS stack, the conventional aircrews maintain a perfect vantage point to enhance the ground force SA. The only problem is a lack of proper mission knowledge as to what is important to the SOF on a particular mission. Conventional aircrews need access to compartmentalized SOF information to make them more effective team members. The SOF ground commander also needs a means to increase the conventional aircrew's SA prior to them arriving on scene, so they can immediately start contributing to the mission.

For preplanned missions, both the Marine Corps and Army communicate the plan to aircrew prior to their mission brief. The Marine Corps understands the importance of the aircrew knowing the ground force requirements. Like SOF, Marine Corps ground forces travel light with minimal organic firepower.[86] The Marines compensate for lack of ground firepower by integrating rotary-wing and fixed-wing fire support.[87] The Marine Corps codifies the central theme of their tactics in their motto "Rifleman First."[88] Marine officers must complete "The Basic School," a six-month indoctrination program, which teaches every officer to command an infantry platoon.[89] This fundamental foundation in infantry ensures that Marine aviators thoroughly understand the capabilities and limitations of the ground forces they are supporting.[90]

Marine aviators often coordinate directly with the ground commander and his staff to comprehend the ground scheme of maneuver prior to mission execution.[91] Full understanding of the ground scheme of maneuver, enables Marine FAC(A)s to take charge on the battlefield and appropriately direct CAS missions.[92] A key result is proactive, instead of reactive, Marine CAS

better poised to shape the battlefield to meet the ground commander's objectives.[93] Additionally, Marines use pilots in the ground Forward Air Controller (FAC) role.[94] This means the FAC is intimately familiar with both the limitations and capabilities of both the ground and air forces, which enhances his ability to properly employ CAS.

Although not to the same extent as the Marine Corps, the Army attempts to maximize aircrew SA prior to mission execution. The larger scale of Army and Air Force operations makes it challenging to have the same intimate interaction between CAS aircrew and ground forces. However, the Army uses Ground Liaison Officers (GLOs) at the Wing level to bridge the gap and increase aircrew mission knowledge and SA prior to arriving on station. The GLOs continually talk with the various ground commanders and their fire support officers and clarify the intent for all CAS missions.[95] The GLOs, trained and familiar with air operations, brief aircrews prior to their missions.[96] The pre-mission brief enables aircrew to understand the mission and start contributing to the ground mission upon arrival on station.[97] Similar to the Marine aircrews, the pre-briefing empowers Air Force aircrews to be proactive members of the overall Army scheme of maneuver.

While neither the Marine nor Army methods can directly transfer to SOF, they highlight the mission enhancement gained from air and ground synergy and provide insight on how to create it. It is not feasible for every CAS aircrew to be "SOF First," like the Marine Corps "Rifleman First" concept, due to the time and skills required to develop effective SOF and effective aircrew.[98] However, it is possible to gain better appreciation, if not understanding, of what SOF ground forces need from CAS aircrews. One of the main things gained through "The Basic School" is an understanding of capabilities and limitations of the infantry. Covered by a veil of secrecy and compartmentalization, due to the covert nature of their mission, SOF prevent

conventional forces from gaining access to classified information. Joint Doctrine states that SOF "must balance security concerns with the need to rehearse and to integrate operations with other committed forces to facilitate unity of effort."[99] However, this seems inconsistent when the same classified access provided to base support personnel on SOF bases, not directly related to mission execution, is denied to the aircrew directly supporting SOF combat employment.[100] Few conventional aircrews pierce the veil of secrecy and truly learn about the SOF missions, capabilities, and limitations. These select aviators then walk the tight rope of classification as they communicate pertinent tactical information back to their fellow aircrew without revealing compartmentalized information. Weapons Officers typically handle this communication during area of responsibility (AOR) pilot indoctrination training, even though the SOF customer may reside on the same base.[101]

To improve conventional CAS effectiveness in support of SOF all aircrew with the potential to directly support SOF missions need to gain access to SOF compartmentalization. Once granted access, an appropriate inbrief must provide the initial foundation to build upon. If possible, this inbrief should include a SOF JTAC addressing their capabilities, limitations, and tactics. The inbrief should include typical operations and how the JTAC foresees using conventional CAS aircraft. As a High Demand / Low Density (HD/LD) asset, SOF JTACs will not always be available to participate in this inbrief.[102] When this is the case, SOF personnel can cover the inbrief and a Weapons Officer or SOF familiar FAC(A) could cover the CAS specific information. By providing access to the SOF world, the conventional units can discuss what they learned with each other in a classified environment and enhance their tactics and SOF support. However, the access must not stop with the inbrief but must continue into an open flow of communication to enhance real-time mission SA.

At the tactical-level, the Army GLO program provides this critical mission specific SA directly to aircrews for conventional CAS missions.[103] While it would be great to create new a Special Operations Liaison Officer (SOLO) program where a number of SOF personnel reside with the conventional air units and provide them pre-mission briefings, it is impractical. As mentioned previously, the SOF community is considered HD/LD and as such does not have the available personnel to fill a SOLO position.[104] Currently, the SOLE exists to coordinate SOF operations with the CAOC.[105] The conventional air units also have Liaison Officers (LNOs) present at the CAOC.[106] One might argue that the SOLE and LNO can provide the SA link from the JSOAC to the aircrew, but that is too many intermediaries passing second and third hand information. Additionally, the constant changing nature of SOF operations means that information quickly perishes and the SA is in the JSOTF.

The solution is to incorporate a Liaison Officer To Special Operations from each combat wing supporting a JSOTF. According to Joint Publication 3-05.1, the exchange of LNOs is critical to enhance SA.[107] This slightly increases the personnel demand on conventional air units, but the benefits greatly outweigh the cost. With access to the compartmentalized information and as a member of the JSOAC, the LOTSO has direct access to the critical information. The LOTSO is part of the entire process and able to gain SA as a SOF mission develops from intelligence through action. The LOTSO will be abreast of the multiple developing missions. The LOTSO can observe and interpret how the changing mission nuisances will affect his aircrews. During mission formulation, the LOTSO builds his own aircrew mission brief and keeps it modified to reflect real-time changes to the mission development.

When the execute command comes, the LOTSO briefs the aircrew and transfers all of his situational awareness, in aircrew terminology, to the tasked aircrew. Time permitting the LOTSO

can electronically pass mission imagery and accompany it with a telephonic briefing. The rapid nature of some SOF missions means that aircrew may already be in their aircraft on ground alert, or airborne. In these cases, the LOTSO can use radios and Link-16, a tactical data link between aircraft and ground stations, to communicate the critical information. Some aircraft can receive imagery and/or free text messages, while others are currently limited to voice communication. The LOTSO would fulfill the Joint Publication 3-09 recommendation that "the tactical unit should contact the unit being supported to conduct detailed tactical planning."[108]

Currently, the JSOAC floor attempts enroute radio communication, but due to the combination of a non-aircrew personnel on the radio and communication brevity, information is lost in translation. As an aircrew member himself, the LOTSO will understand the most critical information to the aircrew for particular missions and effectively pass it to them. Pertinent information may include mission objective, orbit position, associated restricted operating zones, desired CAS tasks (targeting scheme, desired scan pattern or area, etc.), friendly capabilities on station (including vehicles and equipment), and target or friendly location. Now, the aircrew can arrive on station with high SA and proactively support the SOF.

Multiple examples of the LOTSO concept exist today, just under different names. The AC-130 community realized that they were not gaining the appropriate mission knowledge prior to arriving on station.[109] To rectify the knowledge gap, the AC-130 community started sending a representative to the JSOAC who could funnel information and SA to the AC-130 crew.[110] Similarly, OEF fighter pilots recognized a knowledge deficit and corresponding integration gap that they overcame by putting a pilot on the JSOAC floor.[111] While it is good to see that aviators are overcoming the lack of doctrine concerning a LOTSO with ad hoc liaisons, it is time to

codify the LOTSO position in Joint Doctrine to properly leverage its capability to provide aircrew with enroute tactical-level situational awareness.

To take the LOTSO concept one-step further, the Air Force could institute a program similar to the former A-10 Battalion Air Liaison Officer (BALO) program. The A-10 BALO program paired young A-10 pilots directly with Army Battalions.[112] The A-10 pilot liaisons exercised with the Battalions in the field, forming close operational bonds between the supported and supporting units.[113] The BALO program provided a conduit for information. The pilots gained a true appreciation for that specific Army unit's capabilities, limitations, and uses for airpower. The frequent and personal interaction of the BALO with the Ground Commander enabled the BALO to advocate for the proper uses of airpower, and explain the CAS capabilities and limitations in common terms. The BALO program helped build a trusting relationship between air and ground units and a deeper understanding of what each other brought to the fight. The BALO program was discontinued due to manning concerns. In the fiscal and resource constrained environment, within which the Department of Defense is currently operating, limited manning is always a concern. However, there are far fewer SOF units than Army Battalions and the benefits would outweigh the costs. Additionally, to lessen the impact on flying units this program should use aircrew from multiple airframes to decrease the manning requirements for any given unit.

For true synergy, the LOTSO would serve as the liaison to SOF both at home during training, as well as, in combat. Part of making this program a success, requires a shift in the importance the Air Force places on its liaisons. The Marine Corps uses their up and coming aviators to serve as ground FACs prior to attending Weapons School.[114] While making LOTSO or ALO a prerequisite to attend Weapons School in the Air Force may be impractical, it is

possible to choose higher caliber liaisons. Currently, becoming an ALO hampers an aviator's ability to attend Weapons School, because it puts him behind the timeline for required hours and upgrades. However, instituting the LOTSO along the same lines as the A-10 BALO program would only involve short breaks in flying and allow the aviator to continue progressing along required timelines. The Air Force should put a premium on garnering joint experience and knowledge for its young aviators that will provide a foundation for their career.[115] The acquired knowledge would permeate the flying squadrons through academics and casual tactical discussions in the bar. This relationship would prove invaluable by increasing integration between conventional fixed-wing aircrew and SOF in combat operations.

Conclusion

Recent shifts in the focus of combat operations from conventional to irregular warfare require the same shifts in CAS DOTMLPF. The mission set which incorporates conventional CAS aircraft in support of SOF conducting IW, demands explicit doctrine detailing how to properly integrate conventional aircraft into SOF operations from the operational down to the tactical levels. Organizationally, the SOF community needs access to its own ASOC for when it conducts operations independent of the conventional Army. Concerning tactics, doctrine must add a Fixed-Wing Call for Fire. The joint community must prioritize pre-combat SOF CAS training in facilities capable of simulating combat situations. Training must incorporate all players including the SOF ASOC and LOTSO. Conventional aircrew need clearance to access SOF compartmentalized information. Highly capable aircrew need to fill LOTSO positions to bridge the gap between SOF and conventional aircrew at the tactical-level, and to poise aircrew to provide maximum support. The Joint and Air Staffs must seize the initiative and create the conditions for success to enable efficient and effective CAS by updating the DOTMLPF. Failure to improve continues to place the lives of our SOF operators at increased risk.

[1] Call, *Danger Close*, 34-35.

[2] Lambeth, *Air Power Against Terror,* 161.

[3] Ibid*,* 104.

[4] Andres, *Winning With Allies*, 161.

[5] Lambeth, *Air Power Against Terror,* 173.

[6] Call, *Danger Close*, 30.

[7] Ibid.

[8] Call, *Danger Close*, 31.

[9] Ibid.

[10] House Committee on Armed Services, *Close Air Support*, 32.

[11] Pirnie, *Beyond CAS*, 142.

[12] Ibid, 120.

[13] Call, *Danger Close*, 41.

[14] Pirnie, *Beyond CAS,* 120-121.

[15] Ibid, 146.

[16] Jacobs, *Enhancing Fires and Maneuver Capability*, 3-6.

[17] Andres, *Winning With Allies*, 165.

[18] Ibid.

[19] Ibid.

[20] Ibid, 161.

[21] Ibid, 169.

[22] Neuenswander, *JCAS in Operation Anaconda*, 2.

[23] Call, *Danger Close*, 29.

[24] Headquarters ACC, *ASOC Enabling Concept*, 6.

[25] Joint Publication 3-09, Joint Fire Support, II-9,10.

[26] Pirnie, *Beyond CAS*, 144.

[27] Joint Publication 3-05, *Doctrine for Joint Special Operations,* IV-7.

[28] Air Force Doctrine Document 2-1.3, *Counterland Operations,* 46.

[29] Biddle, *Allies, Airpower, and Modern Warfare*, 9-10.

[30] Air Force Instruction 13-114v3, *ASOC Operations Procedures*, 17-18.

[31] Neuenswander, *JCAS in Operation Anaconda*, 2.

[32] Air Force Instruction 13-114v3, *ASOC Operations Procedures*, 18.

[33] Air Force Doctrine Document 2-1.3, *Counterland Operations,* 89.

[34] Joint Publication 3-05, *Doctrine for Joint Special Operations,* III-7-III-9.

[35] Ibid*,* III-11.

[36] Neuenswander, *JCAS in Operation Anaconda*, 2.

[37] Joint Publication 3-09.3, Close Air Support, V-19.

[38] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, interview by the author, 21 January 2010.

[39] Ibid

[40] Ibid.

[41] Pirnie, *Beyond CAS*, 120-121.

[42] Ibid, 146.

[43] JFIRE, 48.

[44] Ibid.

[45] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, Interview.

[46] Senior Master Sergeant Superintendent for Special Tactics Squadron Operations in Afghanistan, discussion at AFCENT Weapons and Tactics Conference, March 2007.

[47] Ibid.

[48] JFIRE, 51.

[49] Ibid.

[50] Weapons School Instructor (2007-2010), 16th Weapons Squadron, interview by the author, 27 January 2010.

[51] Assistant Director of Operations (2008-2009), 6th Combat Training Squadron to the author, e-mail.

[52] Irvin, Maj Ernest J., interview with the author, 17 February 2010.

[53] Weapons School Instructor (2007-2010), 16th Weapons Squadron, to the author, e-mail.

[54] Assistant Director of Operations (2008-2009), 6th Combat Training Squadron to the author, e-mail.

[55] Ibid.

[56] Thompson, Maj Brian, interview with the author, 14 January 2010.

[57] Weapons School Instructor (2007-2010), 16th Weapons Squadron, to the author, e-mail.

[58] Ibid

[59] Ibid.

[60] 549th CTS website.

[61] 548th CTS website.

[62] Kirmis to the author, e-mail.

[63] Ibid.

[64] Ibid.

[65] Ibid.

[66] Ibid.

[67] Ibid.

[68] Ibid.

[69] Ibid.

[70] Ibid.

[71] Ibid.

[72] Ibid.

[73] 98th Range Wing website.

[74] 57th Wing Chief of Scheduling, interview by the author, 10 Feb 2010.

[75] Kirmis to the author, e-mail.

[76] Headquarters ACC, *ASOC Enabling Concept*, 10.

[77] Lester, *Mosquitos to Wolves,* 30.

[78] Clancy, *Shadow Warriors*, 409, 463-468.

[79] Jacobs, *Enhancing Fires and Maneuver Capability*, 3-6.

[80] Wing Weapons and Tactics Officer (May 2009 – September 2009), 332d Air Expeditionary Wing, interview by the author, 22 January 2010.

[81] Ibid

[82] Lambeth, *Air Power Against Terror,* 167.

[83] Wing Weapons and Tactics Officer (May 2009 – September 2009), 332d Air Expeditionary Wing, Interview.

[84] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, Interview.

[85] Ibid.

[86] Stout, *Hammer from Above*, 7.

[87] Ibid, 198.

[88] Ibid, 5.

[89] Marine Officer website.

[90] Lester, *Mosquitos to Wolves,* 17.

[91] Cooling, *Close Air Support*, 542.

[92] Stout, *Hammer from Above*, 261.

[93] Ibid, 315.

[94] Ibid, 261.

[95] Air Force Doctrine Document 2-1.3, *Counterland Operations,* 62.

[96] Ibid.

[97] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, Interview.

[98] Joint Publication 3-05, *Doctrine for Joint Special Operations,* II-2.

[99] Ibid, I-6.

[100] Thompson, Interview.

[101] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, Interview.

[102] Weapons School Instructor (2007-2010), 16th Weapons Squadron, to the author, e-mail.

[103] Wing Weapons and Tactics Officer (September 2007 – January 2008), 332d Air Expeditionary Wing, Interview.

[104] Weapons School Instructor (2007-2010), 16th Weapons Squadron, to the author, e-mail.

[105] Air Force Doctrine Document 2-1.3, *Counterland Operations,* 64.

[106] Ibid, 63.

[107] Joint Publication 3-05.1, *Joint Special Operations Task Force Operations,* I-4.

[108] Joint Publication 3-09, Joint Fire Support, III-12.

[109] Thompson, interview.

[110] Ibid.

[111] Weapons School Instructor (2007-2010), 16th Weapons Squadron, to the author, e-mail.

[112] Belote, Counterinsurgency Airpower.

[113] Ibid.

[114] Ibid.

[115] Ibid.

Bibliography

Air Force Doctrine Document 2-1.3, *Counterland Operations*, 11 September 2006.

Air Land Sea Application Center, *JFIRE: Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Airpower*, December 2007, Langley AFB, VA: ALSA.

Andres, Richard B., Craig Willis, and Thomas E. Griffith, Jr. "Winning with Allies: The Strategic Value of the Afghan Model," *International Security,* Winter 2005/2006.

Assistant Director of Operations (2008-2009), 6th Combat Training Squadron, Nellis AFB, NV. To the author. E-mail, 24 January 2010.

Belote, Howard D. *Counterinsurgency Airpower: Air-Ground Integration for the Long War.* Air and Space Power Journal, Fall 2006, http://www.airpower.maxwell.af.mil/airchronicles/ apj/apj06/fal06/belote.html.

Biddle, Stephen D. "Allies, Airpower, and Modern Warfare: The Afghan Model in Afghanistan and Iraq," *International Security,* Winter 2005/2006.

Call, Steve. *Danger Close: Tactical Air Controllers in Afghanistan and Iraq.* College Station, TX: Texas A&M University Press, 2007.

Clancy, Tom, Tony Koltz, and Carl Stiner. *Shadow Warriors: Inside the Special Forces*. New York, NY: G.P. Putnam's Sons, 2002.

Cooling, Benjamin F. *Case Studies in the Development of Close Air Support.* Washington, D.C.: Office of Air Force History, 1990.

Headquarters Air Combat Command, *United States Air Force Air Support Operations Center Enabling Concept*, 1 June 2006, Langley AFB, VA: HQ ACC/A3YC.

House Committee on Armed Services, *Procurement and Military Nuclear Systems Subcommittee and Investigations Subcommittee Hearing on Close Air Support*, 101st Cong., 1st sess., 19 April 1989, HASC 101-25.

Jacobs, Jody, David E. Johnson, Katherine Comanor, Lewis Jamison, Leland Joe, and David Vaughan. *Enhancing Fires and Maneuver Capability Through Greater Air-Ground Joint Interdependence.* Santa Monica, CA: RAND Corporation, 2009.

Kirmis, Lt Col Paul D., Director of Operations, 549th Combat Training Squadron, Nellis AFB, NV. To the author. E-mail, 12 February 2010.

Lambeth, Benjamin S. *Airpower Against Terror: America's Conduct of Operation Enduring Freedom.* Santa Monica, CA: RAND, 2005.

Lester, Gary R. *Mosquitos to Wolves: The Evolution of the Airborne Forward Air Controller.* Maxwell AFB, AL: Air University Press, 1997.

Marine Officer. "The Basic School." http://officer.marines.com/marine/making_marine_officers/ basic_school (accessed 10 February 2010).

Naval Historical Center. "AV-8 Harrier." http://www.history.navy.mil/planes/av8.htm (accessed 10 February 2010).

Neuenswander, Matthew D. "JCAS in Operation Anaconda – It's Not All Bad News," *Field Artillery*, May-June 2003.

Office of the Chairman, Joint Chiefs of Staff, Joint Publication 3-05, *Doctrine for Joint Special Operations*, 17 December 2003, Washington, D.C.: Joint Staff.

Office of the Chairman, Joint Chiefs of Staff, Joint Publication 3-05.1, *Joint Special Operations Task Force Operations*, 26 April 2007, Washington, D.C.: Joint Staff.

Office of the Chairman, Joint Chiefs of Staff, Joint Publication 3-09, *Joint Fire Support*, 13 November 2006, Washington, D.C.: Joint Staff.

Office of the Chairman, Joint Chiefs of Staff, Joint Publication 3-09.3, *Close Air Support*, 8 July 2009, Washington, D.C.: Joint Staff.

Office of the Deputy Commander, U.S. Joint Forces Command, *Joint Terminal Attack Controller Memorandum of Agreement*, 1 October 2007, Suffolk, VA.

Pirnie, Bruce R., Alan Vick, Adam Grissom, Karl P. Mueller, and David T. Orletsky. *Beyond Close Air Support: Forging a New Air-Ground Partnership.* Santa Monica, CA: RAND Corporation, 2005.

Stout, Jay A. *Hammer from Above: Marine Air Combat Over Iraq*. New York, NY: Presidio Press, 2005.

Weapons School Instructor (2007-2010), 16th Weapons Squadron, Nellis AFB, NV. To the author. E-mail, 27 January 2010.

548th Combat Training Squadron. "Mission Statement." https://www.my.af.mil/gcss-af/USAF/ep/contentView.do?contentId=c6925EC19D3850FB5E044080020E329A9&contentType=EDITORIAL (accessed 14 February 2010).

549th Combat Training Squadron. "Mission." https://wwwmil.nellis.af.mil/units/549cts/default.htm (accessed 14 February 2010).

98th Range Wing. "Mission Planning: UOC." https://wwwmil.nellis.af.mil/units/range/targets/UOC.asp (accessed 14 February 2010).